

CLAIMS:

1. A process for producing synthesis gas, the process including
in a gasification stage, gasifying a carbonaceous feedstock to provide a raw synthesis gas which includes at least H_2 , CO and CH_4 ; and
in a partial oxidation stage, subjecting the raw synthesis gas to partial oxidation in the presence of oxygen to provide an upgraded synthesis gas which includes less CH_4 and more H_2 and CO than the raw synthesis gas.
2. The process as claimed in claim 1, in which the partial oxidation stage is a non-catalytic, thermal partial oxidation stage.
3. The process as claimed in claim 2, in which the upgraded synthesis gas which is produced is substantially free of heavier hydrocarbons and solids, obviating the need to quench the raw synthesis gas with water to get rid of the heavier hydrocarbons and solids.
4. The process as claimed in claim 2, in which the thermal partial oxidation is effected at a temperature of between about 1000 °C and about 1600 °C.
5. The process as claimed in any one of the preceding claims, in which the carbonaceous feedstock is gasified in the presence of oxygen and steam in a moving bed gasifier.
6. The process as claimed in any one of the preceding claims, which includes subjecting the upgraded synthesis gas to a water-gas shift reaction stage to provide a hydrogen enriched synthesis gas with a more desirable molar ratio of H_2 and CO.
7. The process as claimed in claim 6, which includes, in a cooling stage, cooling the upgraded synthesis gas and producing steam at a pressure of at least 34 bar prior to subjecting the upgraded synthesis gas to the water-gas shift reaction stage.

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8. The process as claimed in claim 6 or claim 7, which includes, in a cooling stage, cooling the hydrogen enriched synthesis gas and producing steam at a pressure of at least 34 bar.

9. The process as claimed in any one of claims 1 to 5 inclusive, which includes, in a reforming stage, reforming of steam and a methane-containing feedstock and combining a product stream of the reforming stage with the upgraded synthesis gas.

10. The process as claimed in claim 9, in which the reforming stage is a gas-heated reforming stage in which the upgraded synthesis gas is cooled whilst supplying energy to the reforming stage.

11. A process for producing a synthesis gas derived product, which process includes

producing a synthesis gas in a process as claimed in any one of claims 1 to 11 inclusive; and

in a synthesis gas conversion stage, converting the synthesis gas to a synthesis gas derived product.

12. The process as claimed in claim 11, in which the synthesis gas conversion stage is a Fischer-Tropsch hydrocarbon synthesis stage.

13. The process as claimed in claim 11 or claim 12, in which in the synthesis gas conversion stage, a product gas is formed which includes CH_4 , the process further including separating the CH_4 from the product gas and recycling the separated CH_4 to the partial oxidation stage.

14. The process as claimed in claim 11 or claim 12, in as far as it is dependent on claim 9, in which, in the synthesis gas conversion stage, a product gas is formed which includes CH_4 , the process further including separating the CH_4 from the product gas and recycling the CH_4 to the reforming stage.

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15. A process for producing synthesis gas as claimed in claim 1, substantially as herein described and illustrated.

16. A process for producing a synthesis gas derived product as claimed in claim 11, substantially as herein described and illustrated.

17. A new process for producing synthesis gas, or a new process for producing a synthesis gas derived product, substantially as herein described.